



ESTROGEN AND PROGESTERONE LEVELS FOLLOWING DOUBLE INJECTIONS OF PGF_{2a} IN ESTRUS SYNCHRONIZATION OF SAHIWAL COWS

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ABSTRACT

Synchronization of estrus is the fact of making a number of cows come into heat at the same time. This allows better planning of breeding activities and wider use of artificial insemination. Pharmacological control of the estrus cycle involves synchronization of follicular development that is coupled with the timely induction of corpus luteum (CL) regression and synchronization of ovulation to improve pregnancy rates. The use of two PGF₂ injections at interval of 11 to 14 days is the most popular technique of estrus synchronization in cattle and buffaloes. PGF₂ being a luteolytic agent regulates the life span of the corpus luteum on the ovary, and is therefore, used for estrus synchronization. A total of 6 Sahiwal cows were selected from the Livestock Farm, Adhartal for the experiment after per rectal examination. Two injections of PGF₂ (@ 25 mg I/M) were given 11 days apart. Blood samples were collected on day 0, 11, 12, 13 & 14. Hormonal assay was done in plasma samples by using Enzyme-Linked-Immuno-sorbant-Assay (ELISA) kits. The mean plasma progesterone concentration before treatment was 0.69±0.09 (ng/ml). On day 11 the mean plasma progesterone concentration (ng/ml) was 0.67±0.09 which falls to 0.14±0.03, 0.13±0.03 and 0.10±0.02 on day 12, 13 and 14 respectively following PGF₂ injection. There was gradual increase in mean plasma estrogen concentration from day 0 to day 14. The mean plasma estrogen concentration before treatment was 8.69±0.66 (pg/ml) which increased to a level of 27.59±1.79 pg/ml (P<0.01). Present investigation reveals that Double PGF₂ protocol is found out to be 100% efficient in estrus synchronization for Sahiwal cows.

KEYWORDS: synchronization, estrus, PGF₂, estrogen, progesterone, Sahiwal.

INTRODUCTION

Synchronization of estrus is the fact of making a number of cows come into heat at the same time. This allows better planning of breeding activities and wider use of artificial insemination. Various estrus synchronization protocols have been tried among many other reproductive technologies for improving the fertility of buffaloes. Pharmacological control of the estrus cycle involves synchronization of follicular development that is coupled with the timely induction of corpus luteum (CL) regression and synchronization of ovulation to improve pregnancy rates.

The use of two PGF₂ injections at interval of 11 to 14 days is the most popular technique of estrus synchronization in cattle and buffaloes (Odde, 1990; Singh *et al.*, 2000). PGF₂ being a luteolytic agent regulates the life span of the corpus luteum on the ovary, and is therefore, used for estrus synchronization. However, estrus cannot be synchronized precisely with single injection of PGF₂ because it does not synchronize growth of ovarian follicles. Thus, estrus detection is needed over a 7 day period after PGF₂ administration.

MATERIAL AND METHODS

The proposed investigation was conducted at Livestock Farm, Adhartal, Jabalpur (M.P.) and Department of Veterinary Physiology & Biochemistry, College of Veterinary Science & A.H., NDVSU, Jabalpur (M.P.). A total of 6 Sahiwal cows were selected from the Livestock Farm, Adhartal for the experiment after per rectal

examination. Two injections of PGF₂ (@ 25 mg I/M) were given 11 days apart. Blood samples (5 ml with 10 % aqueous solution of ethylene diamine tetra acetic acid; EDTA as anticoagulant) were collected from each animal aseptically by jugular vein puncture by using sterilized needle on day 0, 11, 12, 13 & 14. Hormonal assay was done in plasma samples by using Enzyme-Linked-Immuno-sorbant-Assay (ELISA) kits.

RESULTS & DISCUSSION

Plasma Progesterone

The mean plasma progesterone concentration 0.69±0.09 (ng/ml) before treatment was higher than mean plasma progesterone concentration 0.10±0.02 (ng/ml) on the day of induced estrus (day 14). On day 11 the mean plasma progesterone concentration (ng/ml) was 0.67±0.09 which falls to 0.14±0.03, 0.13±0.03 and 0.10±0.02 on day 12, 13 and 14 respectively following luteolysis caused by PGF₂ injection on day 11. There was highly significant difference (p<0.01) found within group. The mean plasma progesterone concentration declined from 0.67±0.09 to 0.14±0.03 ng/ml (p<0.01) 24 hrs after second PGF₂ injection on day 11 and further decreased to 0.10±0.02 ng/ml on day of induced estrus. The plasma progesterone concentration decreased drastically to the basal levels of <0.15 mg/ml within 3 hrs after PGF₂ injection at luteal phase in swamp buffaloes (Kamonpatana *et al.*, 1979; Kanai and Shimizu, 1987) and in Murrah buffaloes (Bachlaus *et al.*, 1980).

Plasma Estrogen

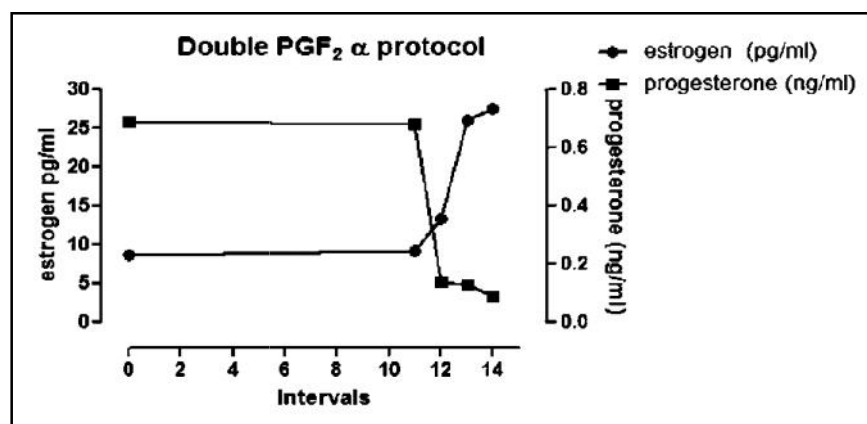
The mean plasma estrogen concentration 8.69 ± 0.66 (pg/ml) before treatment was lower than mean plasma estrogen concentration 27.59 ± 1.76 (pg/ml) on the day of induced estrus (day 14). There was gradual increase in mean plasma estrogen concentration from day 0 to day 14. A highly significant difference ($p < 0.01$) found within group. The mean estrogen concentration was 8.69 ± 0.66 pg/ml which increased to a level of 27.59 ± 1.79 pg/ml ($p < 0.01$) which is close to the finding of Mondal *et al.*

(2010) he reported the plasma concentration of estrogen 11.04 ± 0.13 pg/ml during mid-luteal phase and increased to maximum concentration of 22.48 ± 0.32 pg/ml during peri-estrus phase in buffaloes. By using CIDR implant Caesar (2009) reported the concentration (pg/ml) of estradiol-17 β at induced estrus was 40.47 ± 2.66 to 44.83 ± 1.49 which is in close agreement with reports of Dugwekar *et al.* (2008), who also recorded 40.20 ± 19.68 pg/ml estradiol-17 at estrus.

TABLE 8: Mean Plasma Concentration of Estrogen and Progesterone in Double PGF₂ Protocol

	Day 0	day 11	day 12	Day 13	day 14
Parameters	Mean \pm SE	Mean \pm SE	Mean \pm SE	Mean \pm SE	Mean \pm SE
Estrogen (pg/ml)	$8.69^c \pm 0.66$	$9.18^c \pm 0.56$	$13.41^b \pm 0.59$	$26^a \pm 2.04$	$27.59^a \pm 1.76$
Progesterone (ng/ml)	$0.69^a \pm 0.09$	$0.67^a \pm 0.09$	$0.14^b \pm 0.03$	$0.13^b \pm 0.03$	$0.10^b \pm 0.02$

Mean values with different superscript in rows differ significantly ($p < 0.05$)



CONCLUSION

In the present investigation Double PGF₂ protocol is found out to be 100% efficient in estrus synchronization for Sahiwal cows. Regarding the estrogen and progesterone levels following the PGF₂ injection there is consistent decrease or fall found in the progesterone concentration till the day of estrus. Simultaneously, the estrogen concentration increased to obtain optimum estrogen and progesterone ratio required for estrus.

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